

Amendment to the Claims:

1. (Currently Amended) An apparatus for guiding the movement of a surgical tool in relation to the anatomy of a patient, the apparatus comprising:
~~means for determining an actual position of the tool;~~
~~means for determining a difference between the actual position of the tool~~
5 ~~and a desired position of the tool; and,~~
~~display indicating means disposed remote from associated with the tool~~
for indicating to a human the difference between [[an]] ~~the~~ actual and [[a]] desired positions of the tool, the ~~display indicating~~ means having a ~~display an indicator~~
reference frame[[;]], and ~~means for determining an actual position of the display~~
10 ~~means, wherein~~ the difference [[is]] being indicated with respect to the ~~display~~
indicator reference frame.
- 2-6. (Cancelled)
7. (Currently Amended) The apparatus of claim 1 wherein the indicating means ~~for indicating~~ comprises at least one indicator.
8. (Cancelled)
9. (Currently Amended) The apparatus of claim [[8]] 7 wherein the at least one indicator is mounted to a patient support.
10. (Cancelled)
11. (Currently Amended) The apparatus of claim 10 wherein the means for determining the actual position of the tool comprises one of an infrared localizer and an articulated arm.

12. (Currently Amended) The apparatus of claim 1 wherein the actual and desired positions [[are]] include at least one of a ~~desired~~ location, trajectory, depth, and rotation of the tool.

13. (Currently Amended) The apparatus of claim 1 wherein the indicating means for indicating comprises a position indicator and a mode indicator.

14. (Cancelled)

15. (Currently Amended) An apparatus for guiding the movement of a surgical tool in relation to the anatomy of a patient, the apparatus comprising:

the tool having a pointing axis[[,]] ~~the apparatus comprising[[:]]~~;

means for determining an actual position and orientation of the tool;

5 means for determining a difference between the actual position and orientation of the tool and a desired position and orientation of the tool; and,

display means for indicating to a human a difference between an actual and a desired position of the tool; and

10 means for determining an actual position of the display means, wherein the means for indicating comprises at least two electronic indicators mounted to the tool in a plane substantially orthogonal to the pointing axis, the indicators being connected with the determining means to indicate the difference, in a frame of reference of the tool.

16-21. (Cancelled)

22. (Previously Presented) An apparatus for use with an image guided surgery system, the apparatus comprising:

a surgical tool;

5 first and second display members associated with the tool and arranged along a first line and third and fourth display members associated with the tool and arranged along a second line, the first and second lines being perpendicular, the

display members providing to a human operator an indication of a direction in which the tool should be moved to reach a desired position;

10 a mechanism for determining an actual position of the surgical tool;
a processor programmed to update the tool position, to control the first, second, third, and fourth display members, as the tool moves, to indicate deviations from a planned trajectory in a frame of reference of the display members.

23-25. (Cancelled)

26. (Currently Amended) A method for guiding the movement of a surgical tool with respect to the anatomy of a patient having a patient reference frame, the method comprising the steps of:

5 determining a desired position of the tool based on an image of the anatomy of a patient, the image having an image reference frame;

correlating the image and patient reference frames;

determining an actual position of the tool;

determining a direction in which the tool must be moved to reach the desired position;

10 determining an actual position of a human readable position display disposed remote from the tool having a display reference frame; and

utilizing the human readable position display to indicate the direction in which the tool must be moved to reach the desired position, said indication being provided in relation to the indicator display reference frame.

27-28. (Cancelled)

29. (Currently Amended) A method for guiding the movement of a surgical tool with respect to the anatomy of a patient having a patient reference frame, the method comprising the steps of:

5 displaying an image of the anatomy of the patient on a display disposed remote from the surgical tool;

determining a desired position of a tip of the tool based on the displayed image;

electronically determining a direction the tool must be moved for the tip to reach a desired position;

10 determining an actual position of a position indicator having an indicator reference frame, wherein the position indicator is mounted to the tool and the step of determining an actual position of the position indicator includes determining an actual position of the tip of the tool; and

15 utilizing the position indicator to indicate to a human the magnitude of the distance the tool must be moved for the tip to reach the desired position, said indication being provided in relation to the indicator reference frame, wherein said indication is provided by varying [[the]] one of [[the]] blink rate and color of an indicator visible to a user.

30. (Cancelled)

31. (Previously Presented) The method of claim 26 wherein the human readable position display includes a plurality of light emitting diodes mounted to the tool.

32-41. (Cancelled)

42. (Currently Amended) An apparatus comprising:
a surgical tool;
a display attached to the tool;
a mechanism for locating an actual position location and orientation of a
5 distal end of the tool with its attached display; and
a mechanism for causing the display attached to the tool to indicate to a human a direction in a frame of reference of the tool and the display in which the tool should be translated for the distal end to reach travel on a desired trajectory to a desired position.

43. (Previously Presented) The apparatus of Claim 42, wherein the display comprises a plurality of indicators disposed at angular intervals surrounding a central point.

44. (Currently Amended) An apparatus comprising:

a tool for use in connection with surgery;

5 a first display remote from the tool which displays an anatomical image including target anatomy and a desired trajectory to be followed while moving the tool to the target anatomy;

a mechanism for locating an actual position of the tool relative to the target anatomy as the tool is moved toward the target anatomy;

10 a second display associated with the tool for indicating differences between the actual position of the tool and the desired trajectory, wherein said differences are indicated with respect to the tool; and

a mechanism for causing the second display to indicate to a human a direction in a frame of reference of the second display which the tool should be moved to reach the target anatomy.

45. (Currently Amended) A method for guiding the movement of a surgical tool, said method comprising:

tracking a surgical tool with reference to a patient's anatomy;

5 determining a direction in which the surgical tool should be moved from an actual position for a distal end to reach a desired position with respect to the patient, the desired position being indicated with reference to a diagnostic image of the patient displayed on a display display remote from the surgical tool; and

activating a display on the surgical tool adjacent a handle end to indicate the direction in which a handle end of the tool should be moved to move a distal end of the tool from the determined actual position to reach the desired position.

46. (Original) The method of Claim 45, wherein the indicated direction is relative to a reference frame of the surgical tool.

47. (Currently Amended) An apparatus, comprising:

 a hand-held surgical tool with an associated display operable to have a tip portion inserted into a patent;

 a tool position tracker for tracking a position and orientation of the hand-held tool and the associated display with respect to a reference frame; and

 the display being configured to produce a visual indication of a direction in which a hand-held portion of the tool should be moved for the tip to reach a desired position based at least in part on the position and orientation of the tool as determined by the tool position tracker, the indicated direction being relative to a reference frame of the hand-held surgical tool.

5
10

48. (New) The apparatus of claim 15, further including at least two pairs of electronic indicators.

49. (New) The apparatus of claim 42, wherein the display mechanism includes a plurality of light emitting elements attached to the tool such that illumination of the light emitting elements is indicative of the direction in which the tool should be translated.